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Dispatch Riders at the Voortrekker Monument,
South Africa



THE CANADIAN GEOGRAPHICAL SOCIETY

OTTAWA, CANADA



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SPECIAL REPRESENTATIVES:

Ontario and Quebec: F. A. DALLYN
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Clavering Island in spring, with ice melting in the fiord. Here, at Revet, on the coast of northeast Greenland, in latitude 74° N., Dr. Rodahl lived for fourteen months, making a dietary survey among arctic trappers and carrying out research into the vitamin content of plants and animal organs.

At left, the research station which constituted living quarters and laboratory.

Atonsen

Arctic Nutrition

by KÅRE RODAHL

DURING the last three or four generations the Arctic Ocean and its islands have played an important role in the life of Norway. From a geographical standpoint, Norwegian interests in the Arctic are self-evident, and the fact that a great proportion of Norsemen are actually bred and born north of the polar circle, gives them an advantage in mastering the difficulties of these regions. Norway's sealing fleet ranges from the White Sea to Newfoundland, and sealers, fur trappers, miners, whalers and deep sea fishermen, all contribute to her economic and cultural life.

The pioneering spirit has been paid for by great sacrifice. There are pages in Norway's arctic sagas which tell of innumerable tragedies and hundreds of graves in Spitsbergen bear silent witness to the sufferings and final defeat of men who became victims of scurvy in their struggle for survival in the frozen deserts.

Many of the misfortunes in the Arctic were, and still are, due to lack of information about proper feeding. Although knowledge of vitamins and of illness arising out of malnutrition belongs to recent times, it is a mistake to imagine that scurvy and beri-beri are things of the past. As late as 1940 I had the opportunity of recording a mild case of beri-beri among European trappers in Greenland, and in the winter of 1937 cases of this disease and of scurvy occurred among the trappers.

The problems of arctic feeding have confronted us for many years, but until recently little attention has been focussed on this all important subject. Consequently lack of proper knowledge regarding the presence of vitamins in the flora and fauna of the Arctic Regions has prevented the European trappers from fully utilizing the natural resources, and many a trapper has died in his bunk from scurvy without knowing that just outside the hut door there

were sufficient sources of vitamin C to prevent and even cure his illness.

The importance of arctic nutrition will naturally become more evident with the increasing activity in the North Polar Regions. Although it is generally agreed that proper feeding is an essential factor in maintaining normal health in arctic conditions, the actual requirements of the different nutritive elements under these special conditions have been subject to much dispute.

White Trappers

During the dark period of the year, November to February, the trappers generally show a lack of initiative, complain of feeling lazy, and show symptoms of debility. It has been suggested that this may be due to lack of vitamin C. Furthermore, examination of the crew of a Norwegian hunting vessel, who had spent the previous winter in Northeast Greenland, revealed that the whole crew of twelve men suffered from deficiency in Vitamin A, ten of the



A Norwegian trapper and his wife who went to northeast Greenland in 1939 and, of necessity, remained there during the war years, their children being born in the arctic.



Atonsén

Looking from the edge of the Greenland ice-cap across the inlet to Clavering Island. The small dot on the near bank, left of centre, is the research station.

Dr. Rodahl with two Eskimos from Scoresby Sound who were staying at Eskimonaes on Clavering Island.



men from deficiency in vitamin C, and the captain had manifest beri-beri. Since lack of vitamin A reduces the power of night distinction of the eye, the importance of a sufficient supply of this vitamin is evident in view of the fact that the trapper largely depends upon the power of night vision of his eyes during the dark period of the year.

These results emphasized the need for more detailed investigation of the problems. With a view to ascertaining to what extent vitamin deficiency might apply to the health of the arctic trappers, a comprehensive study of their diet during four periods of the year was made during an expedition to Northeast Greenland in 1939-40.

For fourteen months I lived in a small laboratory established on the barren coast of Northeast Greenland at the edge of the inland ice. Here we were to carry out a dietary survey among arctic trappers, and to apply the chemical methods for vitamin determinations in plants and animal organs

which we, in a modern laboratory in Norway during the previous year, had modified to suit arctic conditions. This we succeeded in doing under very primitive conditions and amid a constant battle against hostile nature. During the seemingly endless winter this laboratory was the centre of our humble existence completely cut off from the rest of the world.

While deficiency diseases have been common among European trappers in the Arctic, who mainly subsist on imported foodstuff, they were practically unknown among native Eskimos, who lived entirely upon arctic animal organs, and plants. It would therefore be of interest to compare the Eskimo diet and its vitamin content with that of the European trappers.

We know that the Eskimo eats practically all parts of the animals except the skin and bones. He considers the internal organs a delicacy and usually leaves the meat to the last. The European trapper almost exclusively eats the meat and seldom eats more than the liver of the internal organs, often discarding this too. We also know that the Eskimo eats large quantities of both sea and land plants, while the European trapper seldom eats any of them.

It is interesting to note that all the internal organs and plants which have the highest vitamin contents are considered as particular delicacies by the Eskimo and, without knowing anything about vitamins, some of his methods for preparing stored foods offer the best possible preservation of the vitamins.

Vitamin Sources

The main sources of vitamin A in the Arctic Regions are the livers of sea and land mammals and fish. Of these the livers of polar bear (50 grams of which may supply the normal requirements of one man during a whole year) and of certain seals, particularly bearded seal (which may be as rich in vitamin A as the polar bear liver), are the richest sources of this vitamin. The vitamin A concentration is naturally an expression of the vitamin A richness of the food which these animals eat. The seal eats a large amount of herring, cod, etc., and the seal liver in turn constitutes an important part of the food of the polar bear. Thus an increasing accumulation of vitamin A takes place in the livers as one moves up in the animal kingdom, from the fish to the polar bear.

It has been known for centuries among Eskimos and arctic travellers that livers of certain arctic mammals such as the polar bear and the bearded seal are poisonous. In experiments on rats this has been found to be due to the huge amount of vitamin A present in these livers, resulting in the condition of hypervitaminosis A when these livers are eaten in large quantities. The livers of other arctic mammals, such as the snow hare and the walrus, which are considered non-poisonous by the Eskimos, were found to contain only moderate or small amounts of vitamin A, while the liver of Greenland fox, which is considered poisonous by the Eskimos and consequently never eaten by them, contained similar large

Interior of the laboratory at Revet





A walrus resting on an ice-floe.

amounts of vitamin A to the livers of polar bear and bearded seal.

The most valuable arctic sources of vitamin B₁ were found to be internal organs of the arctic animals, such as the liver, spleen, testis, kidney and the heart, as well as fresh meat of arctic birds, roe of salmon, and the skin of the narwhal (mattaq) which is also particularly rich in vitamin C. Of these only roe of salmon and mattaq can supply the necessary amount of vitamin B₁ when eaten in normal quantities.

Determination of the vitamin C content of arctic plants showed that several of the plants common in Greenland were very rich in vitamin C. There are considerable seasonal variations in the vitamin C content of the plants examined, the highest values being found in the middle of the summer. It is interesting to note that the arctic willow, which is the main food for the musk-ox and ptarmigan is comparatively rich in vitamin C even in winter time.



Skinning a walrus.

Marine algae, which contain appreciable amounts of vitamin C, are consumed in large quantities by the Eskimos, who eat them raw or dipped in boiling water or with blubber oil. In certain areas of Greenland the Eskimos obtain 50 per cent of their total vitamin C intake from this source

Arctic hare.



Rock ptarmigan in summer plumage.



during the summer months. Marine algae (seaweeds) have also been used as food in Japan, China, Hawaii and Iceland.

The fact that no vitamin C deficiency is known among the East Greenland Eskimos, who for a greater part of the year live entirely on the organs of arctic animals, indicates that these animals contain sufficient vitamin C to satisfy normal requirements. Stefansson, who first directed attention to this fact, cured three cases of scurvy with fresh meat.

Chemical analyses revealed that the internal organs, such as the liver, brain and kidneys, of the arctic mammals which constitute the main source of food supply, as well as musk-oxen and seals, were rich in vitamin C. It is interesting to note that some of the organs which are eaten by the Eskimos but not by the European trappers, such as the testicles of musk-ox and fiord seal, had a relatively high content of vitamin C. Spleen and lymph glands from musk-ox and seals, which are eaten by Eskimos but carefully avoided by the European trapper who considers them inedible, were also rich in vitamin C.

Fresh meat of musk-ox, which forms the most important source of food supply of the European trappers, contained 1 mg. vitamin C per 100 grams. When stored or salted or fried thoroughly the meat lost its vitamin C content, which it retained when cooked fresh in the usual trapper manner.

The liver of musk-ox and seals contained an average of 10-25 mg. vitamin C per 100 grams, and only a slight deterioration took place when stored frozen during a period of several days.

Mattaq (the epidermis of the narwhal) which has long been known as an excellent



A trapper with a Greenland seal on the pack ice.



An Eskimo catching seals in a net.

remedy against scurvy among arctic people, was very rich in vitamin C—100 grams yielding the daily human requirement. It is frequently eaten by the Eskimos who keep it stored in sea-water. The same vitamin C content was found in the roe of salmon.

Altogether an average sized musk-ox provides sufficient vitamin C for one man for sixty days. The internal organs alone would provide sufficient for twenty days.

Considerable amounts of vitamin C were detected in the liver, brain and intestines of the arctic birds. Birds form an important food supply in the spring, at which time scurvy used to be most common among European trappers in the Arctic.

These findings are in agreement with the fact that during certain periods of the year



A catch of arctic salmon or char.



Catching narwhals through the ice. The Eskimos' trousers are polar bear fur, their artiggis dog-skin or reindeer.

Below:—A catch of narwhals on the beach.

the East Greenland Eskimo secures 50 per cent of his vitamin C requirements from marine algae, the other 50 per cent being obtained from organs of mammals, birds and fish. It thus appears that when the natural sources of this vitamin are properly utilized there should be no reason to suffer from scurvy in Arctic Regions, even without supplies of fruits, vegetables or other sources of vitamin C from more temperate zones.

On the other hand a number of the imported foodstuffs used by the European trappers in Greenland were seriously lacking in vitamin C content, among them being frozen potatoes, pickles, dehydrated travelling provisions, mixed fruit salad and salted or dried meat and fish.

Other European foodstuffs consumed by the trappers, such as dried potatoes and vegetables had appreciable amounts of anti-scorbutic vitamin. Commercial concentrated lemon juice, which was considered by the trappers as a legal antiscorbutic medicine on

winter expeditions, and is usually taken as such, had no vitamin C content whatsoever when examined after a few months storage in arctic conditions.

Calory Consumption

A dietary survey during the four seasons of the year among Norwegian trappers in Northeast Greenland showed that the average gross consumption per man was 2,969 calories per day, varying from 3,311 in the summer to 2,093 in the middle of the winter. This result is at marked variance with the views of many travellers who have estimated that at least 5,000 calories would be necessary under arctic conditions. However, really hard work is only done occasionally, for instance when travelling by skis under difficult conditions. During the dark period of the year, when the food intake and calory consumption is at a very low level, weather conditions usually prevent any exercise taking place. At times, the trappers are confined indoors for several



weeks, during which periods they rest in their sleeping bags for the greater part of the day. They are adequately protected against loss of heat by well heated houses. In the autumn and early spring the trappers travel by sledge and dogs along the fiord ice, and as the going is normally good, they are able to sit on the sledge during the journey, well protected by warm fur clothing. During the late spring when the fiord ice is breaking up and the snow is melting on the land, the trappers are again confined to their huts. In the summer, they usually travel by motor boat, which consequently does not entail hard work. These circumstances may well explain the surprisingly low calory consumption of the European trappers in Greenland.

In this connection it should be noted that the total average energy expenditure of an adult Greenland Eskimo is 2,700 to 2,900 calories. This may be explained by the fact that the Eskimo does not normally go out in his kayak when the weather is bad, and he avoids travelling when the snow conditions are such that he must walk on foot instead of sitting comfortably on the sledge and being pulled by his dogs. Although enormous amounts of work may occasionally be carried out during a short period at times when the possibilities of hunting are exceptionally good, most of the time is spent in waiting for the game to appear or for the fish to bite. Furthermore, the Eskimo's clothing offers an excellent protection against loss of heat.

Trapper and Eskimo Diets

Compared with the Canadian dietary standard, the trapper's consumption of protein is slightly higher, and of fat much higher. On the other hand, the consumption of carbohydrates is comparatively low. The trapper's diet, similar to that of the Eskimo, is more a fat diet than a carbohydrate diet. The trapper's average consumption of calcium, phosphorus, and iron is also higher than the Canadian standard.

During the autumn the trapper's consumption of vitamin A is above normal requirements. In this period most of the

vitamin A is obtained through the ingestion of eggs, butter, cheese, milk and vitaminized margarine. During mid-winter, at which time there is practically no daylight, the intake falls much below normal requirements. In the spring and summer the vitamin A consumption still remains at a low level. The Greenland Eskimo, on the other hand, has a very high vitamin A intake during all periods of the year, perhaps as much as 50,000 I.U.vit.A daily, thanks to the ingestion of livers rich in vitamin A.

The European trappers consume very little vitamin B₁, while the Eskimo diet is very rich in this vitamin.

The consumption of vitamin C throughout the whole year was less than the figures considered as normal human requirement. Thus in the middle of the winter the intake was less than 10 mg. vitamin C per day per individual, although no distinct symptoms of scurvy were observed among these trappers. It has previously been found that Europeans in Greenland during sledging journeys of long duration subsisted on less than 15 mg. vitamin C daily without any ill effect. In the Greenland Eskimo the daily average intake of vitamin C has been found to be 36 mg. per individual, varying from 0 to 100 mg.

Practically all winter expeditions are now provided with vitamin C tablets. These tablets are not popular with the trappers,



A very old musk-ox, killed in Peary Land.



Eskimo with a pile of musk-ox meat—eyed hungrily by his dog. Near Clavering Island.

however, and are often discarded. It seems therefore advisable to provide vitamin C in a palatable form that would be taken regularly, such as lemon for instance, the vitamin C content of which remains stable for many months when stored frozen.

Because dried potatoes and other vegetables can be more conveniently transported and stored without serious deterioration to the vitamin C content over a period of years, these food commodities should be made available in preference to canned food which may lose a considerable proportion of vitamin C during the canning process. The foodstuffs, in all instances, should be stored below freezing point to prevent any deterioration occurring.

In view of the fact that proper feeding is an essential factor in maintaining normal health in arctic conditions, interest in the subject should be maintained. Residents should be encouraged to utilize the natural sources of vitamins which should take the place of less valuable imported foodstuffs.

Climatic conditions in the Arctic Regions have made it necessary for the Eskimo to have a much higher fat consumption than the white man in more temperate zones. Necessity developed in him a liking for seal blubber that is now hereditary. Through generations he developed the ability to assimilate large amounts of fat. It is clear that the Eskimo is so specialized and adapted to his own way of living in his peculiar environment that any change would mean the destruction of his race, and this, in my opinion, is what is happening to the Eskimo today. The white man has given him the rifle—the harpoon is more or less forgotten—and sugar, bread, alcohol, and even butter form part of his daily diet. His diet is becoming increasingly of a carbohydrate nature, with the result that the Eskimo is becoming unsuited for the arctic conditions under which he lives. Epidemics of tuberculosis and influenza are frequent and dental caries which formerly occurred only in isolated cases is now common.

A herd of musk-oxen. The hides are used to cover tents and for rugs; the meat is good eating.





BIRD SERIES — Part VII

Photographs and Notes by W. V. CRICH

LESSER YELLOW-LEGS

Totanus flavipes

THE Lesser Yellow-legs is an exact replica of the Greater Yellow-legs in markings and behaviour. Its size is its distinguishing mark, being one-third smaller, though this difference is not readily apparent unless one sees both species at the same time.

Good identification marks for this lovely bird are its long, slender, yellow legs, and a large amount of white on the tail and rump which is particularly noticeable when the bird takes off in flight.

Except during the nesting season, when it inhabits the uplands, it is to be found in mud-flats bordering rivers and lakes or in shallow sloughs. These birds are very wary; when they sense the approach of danger, they warn other species in the vicinity by their noisy "wheu kip". For this reason hunters often call them the "lesser telltale".

As they are gregarious in habit, single individuals are seldom seen. They can easily be decoyed by the hunter, and for that reason their numbers are decreasing. If one should be wounded, the remainder of the flock will circle overhead until they, too, meet the same fate.

The Yellow-legs nests far to the north around Churchill and James Bay. A hollow is scratched out of the ground and lined with leaves. The four eggs are greyish or buff in colour and heavily blotched with browns and greys.

Wintering, as they do, in the southern part of South America and nesting in the northern part of North America, they are only likely to be seen briefly during their migration.



MALLARD *ANAS PLATYRHYNCHOS PLATYRHYNCHOS*

THE common Mallard, or greenhead as it is often called, is well known and prized for its beauty and tastiness. The adult male is beautifully marked, with a brilliant green head and ruddy breast. Around its neck it has a narrow white band. There is a brightly coloured area of violet, bordered front and back with white on the secondary wing feathers. As in the majority of birds, the female is drab by comparison, but still shows a similar coloured area on the wings. This is called a speculum. The rest of the plumage is mottled brown.

The Mallard will nest wherever it can find seclusion and a small pond or lake. Occasionally it will nest some distance from the nearest pond or slough. Its nest is generally well hidden under brush or under an uprooted tree. It is built of any suitable material found in the immediate vicinity, such as dried weed stems, sticks, or dead reeds. At first no down from the bird's breast is added to the nest, but as the incubation period proceeds a quantity of down is added until finally, when the young are hatched, a considerable amount of warm, feathery down has accumulated. From six to twelve eggs constitute a full set for the Mallard. The nest of five eggs shown in the photograph is evidently not complete, and as yet only a small quantity of down has been added. The eggs are practically lustreless and vary in colour from nearly white to a light greenish buff.

When a number of ducks are nesting more or less closely together, they often lay their eggs in other than their own nests. This will explain a large number of eggs in one nest, where the female has difficulty in covering them all. Occasionally they nest in trees, taking over a large abandoned nest of a hawk or crow for this purpose. The male does not assist in the incubation of the eggs, which lasts for approximately four weeks.

The natal down of the young ducklings is soon dry, and they are able to leave the nest within twenty-four hours after leaving the shell. If the nest is some distance from water, the female proudly escorts her progeny across the intervening land to the nearest pond. Such a procession is shown in the accompanying photograph. The Mallard is quite adaptable in its food, and insects and succulent parts of plants are equally acceptable. Mallards are particularly destructive of mosquitoes in their larval and pupal stages. They are also very fond of wild rice and other grains.





MARSH HAWK *CIRCUS HUDSONIUS*

THE Marsh Hawk is considered by many as the most beneficial of all our hawks. It rides our fields of large numbers of rats, mice and other small, injurious mammals, as well as snakes and insects. The loss caused by the small number of young birds it takes is paid for many times over by its destruction of harmful rodents.

These birds frequent our meadows and marshes, where they may be seen circling close to the ground, following fence rows and ditches in their search for mice. Their nests are built on the ground, among the cattails of a marsh, in a clump of grasses in some field. The four to six eggs are a pale bluish white.

This hawk is identified by its long, flexible wings and its long tail, with a large, white patch at its rump. The male is ashy gray and the female is warm brown in colour.

As the male returns with food for the young or for the incubating female, it flies directly over the nest uttering its cry of *kee, kee, kee*. The female rises to meet the male in the air. When close together, the food is dropped by the male, caught by the female, and she returns directly to her nest. Watching for this procedure is the most practical way of discovering a nest of this species.

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KILLDEER

OXYECHUS VOCIFERUS VOCIFERUS

(Lat. *oxyechus* sharp-sounding; Lat. *vox* voice + *ferre* to carry)

THE Killdeer Plover is the most widely distributed and best known of all our shore birds. It is easily recognized in the field, both on account of its markings—a white collar with bands across its lower neck and upper breast—and by its voice.

The Killdeer is a noisy bird, much in disfavour with the hunter on account of his shrilly cry of "kill-dee! kill-dee!", which sounds the alarm to any bird the hunter may be stalking. The Killdeer in its natural habitat is quite inconspicuous. Black bands divide the bird into different sections so that it loses all continuity of form and no longer looks bird-like. The hunter stalking other game is generally not aware of the Killdeer's presence until it flies screaming shrilly into the air.

In spite of arousing the huntsman's ire, the Killdeer is a friend of man. It destroys tremendous quantities of insect pests. About 97 per cent of its diet is composed of insectivorous food; the remainder is made up of noxious weed seeds such as the seeds of the smartweed and the foxtail grass.

The Killdeer nests anywhere on the ground, generally in the open, where it can have plenty of warning of an approaching enemy. Pastures, gardens, and bare, gravelly ground, such as along roads and railways, are favourite nesting places of this bird. The ground is scooped out and a few pebbles or stones are placed in and around the hollow. The eggs are then laid in this hollow and the only lining, other than the chips of stone, is a few bits of stock or some short lengths of dried grasses.

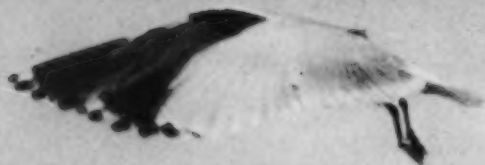
The eggs, generally four in number, are drab or greenish buff, and profusely spotted or blotched with black, brown, and lavender. They are quite large in proportion to the size of the bird. They hatch in about three weeks, and the young, as soon as their down is dry, are able to stand up and leave the nest. They can easily be recognized as Killdeers, for their markings very closely resemble those of their parents. The young try to escape detection by means of their pebble pattern and by remaining motionless on the ground, where they wait for an opportunity to run and escape. Once on their feet, if they are on level ground, it takes quite an agile person to catch them, even if they are only a few hours old.

Whenever in a species we find both adults similarly coloured, then they usually share in the duties of incubation and the care of the young. Such is the case with the Killdeer. After the eggs are laid and the time for incubation approaches, a bare area on the middle of the breast known as the "brood spot", becomes suffused with blood. This supplies the needed heat to the eggs. In the photograph of the adult settling on the eggs, the feathers of the breast are beginning to part to expose the "brood spot" to the eggs.

It is impossible to approach the nest or young of the Killdeer without one or other of the adults sounding the alarm. One adult, on guard, circles the nest giving the warning cry, and the other adult, on hearing this, runs swiftly along the ground away from the nest. Later, when some distance away, it rises from the ground and joins its mate in circling around the enemy. If the enemy still approaches until quite close to the nesting site, both birds play the usual wounded bird act to beguile the intruder from the eggs or young. Many birds feign being wounded under similar circumstances, but none that I have seen have ever dragged themselves so pitifully over the ground as the Killdeer does in the hope that the intruder will follow it.

When feeding, the Killdeer alternately runs and then stands still, to see if everything is all right; then it suddenly dabs at some food on the ground. This procedure is repeated over and over again. It also has the characteristic plover habit of bobbing its head up and down. They are able to run with great rapidity, and this serves them to good purpose in the pursuit of insects.





HERRING GULL

LARUS ARGENTATUS SMITHSONIANUS (Lat. *larus* sea-bird; *argentatus* ornamented with silver)

THE Herring Gull is the best known and the most widely distributed sea gull of the Northern Hemisphere. At any time of the year it may be seen near or over the lakes making up the great St. Lawrence River system as well as on the numerous lakes of the interior where it gives good service as a scavenger.

Herring Gulls generally place their nests on the ground, either making no nest on the sand, or else building a more or less bulky nest of seaweed, grass, and other material. The Herring Gull is a social bird and prefers to have company. For this reason it breeds in colonies, generally on islands, and always near some body of water.

Only one brood a year is raised, but if the eggs from the first laying are destroyed, the bird will continue to lay until a brood is successfully reared. The eggs are generally three in number, and bluish white, irregularly spotted with various shades of brown. The young are soon able to stand up after leaving the egg, and the instinct to hide in the crevice of a rock or in a clump of grass seems to develop within a few hours of hatching.





An adult snowy owl (Nyctea nyctea). The colouring of these large birds varies from immaculate white to white heavily barred with dark brown, the whitest being the old males.

W. V. Crichton

Churchill, Manitoba, a Naturalists' Rendezvous

by M. Y. WILLIAMS

THE MOUTH of the Churchill River marks the meeting place of the Hudsonian and Arctic life zones, and the mingling of fresh and salt water habitats. The northern timber ends three miles south of the river mouth, leaving a narrow belt of tundra, typical of the Arctic Zone, bordering Hudson Bay. Resident life is of transitional type and migrants vary with the season. Far northern

Arctic species of birds pause on their journeys, and summer residents arrive in waves, as their respective nesting times draw near. The Churchill River valley forms a flyway from the lake region of northern Manitoba and central Saskatchewan to the southwest, and the shore of Hudson Bay guides the wanderers northward from the Great Lakes and James Bay migration route.

A general article about Churchill, Manitoba, by Dr. M. Y. Williams appeared in the September 1949 issue of the Journal.

Caribou wander through the area and even into the settlement in some seasons, and seals and white whales frequent the shore waters and river mouth. The Churchill River is the traditional boundary between the Eskimos of the north and the Chipewyan Indians of the south and west.

During more than three hundred years, explorers, geographers, astronomers, have called at Churchill or made it headquarters. They have contributed general information about the region and they and Hudson Bay post managers collected plants, animals, birds and fishes for British museums. Upon these specimens new species were founded.

The modern and more typically American investigations began with the visits of the Canadian geologists Dr. Robert Bell in 1879-85 and Dr. J. B. Tyrrell in 1894 and '95. There followed the visits of Edward A. Preble, of the U.S. Biological Survey in 1900 and of Percy A. Taverner, George M. Sutton and associates, of the National Museum of Canada in 1930-33. Upon the work of Preble and Taverner, the general biological knowledge of Churchill is based. New information is, however, constantly coming to light and much fundamental work is still to be done, especially on freshwater biology, insects and plants.

Information on the mammalian life of Churchill may be culled from Preble's report on the Hudson Bay region which includes twenty-six species. Among them are the Beluga or white whale, four seals, the woodland caribou, the Hudson Bay muskrat, Hudson Bay varying hare, the Canada lynx, the timber wolf, red and Arctic foxes, the polar bear, the Keewatin mink, the Hudson Bay varieties of the marten and wolverine, the Richardson weasel and Atlantic walrus. Of the smaller mammals, Richardson's lemming was the most common, but there are three species of *Microtus* (meadow mice), the rare *Phenacomys mackenzii* Preble, and the Hudson Bay jumping mouse. Hearne (in the 1770's) had reported musk-ox tracks near the port, but this fine animal and the Atlantic walrus have apparently disappeared from the locality.

In *The Birds of Churchill, Manitoba*, Taverner and Sutton list 142 species, and 9 more as hypothetical. Subspecies are not counted. The identified species may be summarized as follows:—3 loons, 2 grebes, 1 bittern, 1 swan, 3 geese, 19 ducks, 11 diurnal birds of prey, 1 grouse, 2 ptarmigan, 2 cranes, 1 rail, 3 jaegers, 6 gulls, 3 terns, 1 guillemot, 1 dove, 1 pigeon (passenger, extinct), 4 owls, 1 nighthawk, 1 kingfisher, 4 woodpeckers, 45 perching birds. A. A. Allen (1945, *Auk* 62, pp. 130-131) added 8 sight additions of perching birds.

The meeting of land, freshwater and sea is clearly indicated by the families of birds present. Preble mentions the following birds and mammals as breeding in the Arctic zone: various species of sandpipers, northern phalarope, willow ptarmigan, Hudsonian curlew, Hudsonian godwit, pipit, Lapland longspur, Smith's longspur, the Arctic fox and Richardson's lemming.

Birds typical of the Hudsonian zone include the Canada jay, white-crowned sparrow, fox sparrow, Bohemian waxwing and pine grosbeak. The bluebird, Western meadowlark, rusty blackbird and grackle suggest an even more southern admixture.

The writer visited Churchill from June 11th till July 10th, 1947. Other ornithologists present were Mr. Frank Farley of Camrose, Alberta, Miss Hazel R. Ellis of Keuka Park, N.Y., Messrs. W. B. Gumbart and R. S. Judd of New Haven, Conn. Mr. Farley, veteran oologist, had visited Churchill on several occasions, including 1930 when Taverner was present, and was a most competent tutor. Philip Erlenbach, Miss Ellis' twelve-year-old nephew of Hempstead, Long Island, aided greatly in finding nests and catching fish and frogs. The following account includes observations made by all the workers in the field. It is given as an illustration of the more obvious life of the region.

Mammals

White whales (*Delphinapterus leucas* (Pallas)) played about in schools in the open water of Hudson Bay and off the river mouth until the ice went out the night of June 20-21,



after which they entered the harbour in small numbers. Residents then took advantage of their presence in the shallow water to capture a number for dog feed. Approaching his prey in a power canoe, the hunter drives a harpoon deep into the whale, but retains the shaft. To the head of the harpoon is attached a line and a ten-gallon oil drum. The drum shows the course being followed and as the whale rises to blow, the hunter shoots it with a rifle until it is killed. Visitors occasionally join the whalers as a matter of sport. The whales average about twelve

feet in length and are said to weigh about 1,500 pounds. The skin is very thin and smooth.

Seals hauled out on the floating ice of the bay to enjoy the pallid sunshine and were occasionally taken for dog feed. A large species is known locally as "a square-flipper" and is probably the Bearded Seal *Erignathus barbatus* (Erxleben) which Preble reported as common.

Straggling woodland caribou *Rangifer caribou* (Gmel.) were seen from the train south of Churchill and a young cow rambled about south of town from June 28th until the first week of July. Mr. George Reid, Hotel Proprietor, reports the absence of caribou in the vicinity of Churchill in 1931. In 1934, they were so numerous as to stop the train and they have been periodically numerous ever since. They are commonly killed for dog feed.

Lemmings were seen on a number of occasions and a specimen taken proved to be *Dicrostonyx richardsoni* (Merriam).

No wolves were reported from Churchill itself but there were numerous well authenticated accounts of men having been bitten by wolves in tributary territory during the preceding winter and spring. Mr. Reid told of an old trapper, Barnston, being attacked

At top:—The lemming, a small rodent that looks like a large, chunky, field mouse.

A white whale (*Delphinapterus leucas*) on the beach at Churchill. Grain elevator and dock in the background.

M. Y. W.



Right:—An Arctic fox in its winter pelage

Below:—Head of a young Arctic hare in summer. For about nine months of the year it is snow-white.



and bitten in the hand by a wolf while unloading caribou meat from his canoe. Another trapper near God's Lake had his arm lacerated by a wolf. Mr. Legerd, a missionary who had spent the winter at Eskimo Point, reported that an Eskimo had been bitten in the back through his parka.

Birds

The birds make a strong appeal to visitors and their occurrence may be illustrated by the 47 species noted by the writer and his associates. The migrating shore birds were seen mostly on the river flats about four miles south of town. Gulls, terns and jaegers were ubiquitous but were most common in flight off the shore of Hudson Bay, east of town, where the capelin attracted them. The tundra with its numerous ponds provided nesting sites for water loving birds, the rocky uplands for larks and pipits, dwarf spruce for sparrows, red-polls, warblers and Bonaparte gulls.

The following birds were recorded:—

Arctic loon, *Gavia arctica* (Linnaeus). Off the coast until the lakes opened up. Mr. Farley found a nest with two eggs on an island in a pond near Lake Rosabelle.

Horned grebe, *Colymbus auritus* Linnaeus. A floating nest with eggs found by Mr. Judd, June 21. There were four eggs on June 25th.

American bittern, *Botaurus lentiginosus* (Montagu). Reported three times.

Whistling swan, *Cygnus columbianus* (Ord.). Three seen in flight.

Canada goose, *Branta canadensis* (Linnaeus). Several common near old nests about Landing or Farnworth Lake and vicinity. Evidently nesting.

Mallard, *Anas platyrhynchos* Linnaeus. Five males seen, one flying with black ducks.

Black duck, *Anas rubripes* Brewster. Fairly common, one nest found.

Baldpate, *Mareca americana* (Gmelin). Several seen.

Pintail, *Dafila acuta* Vieillot. The commonest nesting duck. Nest and eight eggs June 16; nine eggs, June 27.

Green-winged teal, *Nettion carolinense* (Gmelin). A nest with nine eggs near Farnworth Lake June 27.

Greater scaup, *Nyroca marila* (Linnaeus). One nest; five eggs on June 25th.

Old squaw, *Clangula hyemalis* (Linnaeus). Very common and several nests found. Five eggs June 27th.

Common eider, *Somateria mollissima* (Linnaeus). Seen at harbour entrance June 12th.

White-winged scoter, *Melanitta deglandi* (Bonaparte). Small flocks off harbour mouth; occasional in river.



Willow ptarmigan in the Churchill district, June 1947.

Surf scoter, *Melanitta perspicillata* (Linnaeus). A few off harbour mouth June 20.

American scoter, *Oidemia americana* Swainson. Common off harbour mouth June 20th and in harbour July 5th.

Common merganser, *Mergus merganser americanus* Cassin. Two males seen by the author at Pump Lake on June 28th. Neither Preble nor Taverner and Sutton record this species from Churchill.

Red-breasted merganser, *Mergus serrator* Linnaeus. A few pairs seen.

Rough-legged hawk, *Buteo lagopus* (Gmelin). A pair seen commonly south of town.

Marsh hawk, *Circus hudsonius* (Linnaeus). Several seen, one male in light plumage (p. 65).

Pigeon hawk, *Falco columbarius* Linnaeus. One reported by Mr. Farley.

Willow ptarmigan, *Lagopus lagopus* (Linnaeus). Many dead birds lying under telegraph lines and near townsite. One nest in edge of woods, June 16th. Males with brown heads fairly common.

Semipalmated plover, *Charadrius semipalmatus* Bonaparte. The commonest nesting shore bird. Four eggs June 21.

Killdeer, *Oxyechus vociferus* (Linnaeus). A pair or two seen near town (p. 66).

American golden plover, *Pluvialis dominica* (Müller). Ten birds seen. Three nests found June 22 with four eggs in each, in moss of tundra within timber. Hearne reported a man could shoot bags full in an afternoon.

Black-bellied plover, *Squatarola squatarola* (Linnaeus). A flock of four migrating June 11-16.

Turnstone, *Arenaria interpres* (Linnaeus). Common in migration June 11th till the 15th. This beautiful "Calico snipe" is admired from Florida to its Arctic nesting grounds.

Wilson's snipe, *Capella delicata* (Ord.). Common in mating flight until July 5th. Evidently nesting in the edge of the woods.

Hudsonian curlew, *Phaeopus hudsonicus* (Latham). Common and nesting freely in moss of tundra near edge of timber. Seven nests found with four eggs each.

Lesser yellow-legs, *Totanus flavipes* (Gmelin). Commonly seen calling from the top of spruce trees and near town. Evidently nesting (p. 61).

CHURCHILL, MANITOBA, A NATURALISTS' RENDEZVOUS

Knot, *Calidris canutus* (Linnaeus). A fairly common migrant till June 15th.

Pectoral sandpiper, *Pisobia melanotos* (Vieillot). A fairly common migrant until end of June.

Least sandpiper, *Pisobia minutilla* (Vieillot). The second most common nesting shore bird.

Dunlin, *Pelidna alpina* (Linnaeus). A fairly common migrant until June 15.

Dowitcher, *Limnodromus griseus* (Gmelin). Fairly common. Mr. Farley found one nest, June 17th.

Stilt sandpiper, *Micropalama himantopus* (Bonaparte). Common and nesting freely June 21st. The song of this bird and its beautiful eggs make it a most attractive species.

Semipalmated sandpiper, *Ereunetes pusillus* (Linnaeus). The third most common nesting shore bird.

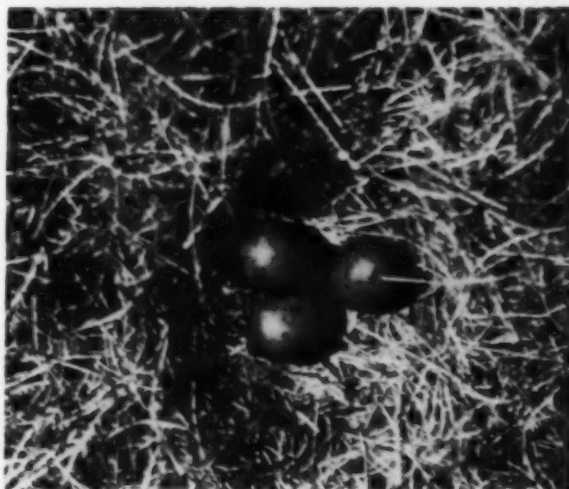
Hudsonian godwit, *Limosa haemastica* (Linnaeus). The finding of a nest of this species was the outstanding event of the season. Taverner had collected a female in 1930 with well developed eggs in the ovaries, but no nests had been found nearer than Anderson River and the mouth of the Mackenzie River. Miss Hazel R. Ellis had come to Churchill for the express purpose of finding the godwit's nest, and an account of her success is given in Audubon Magazine, May-June, 1948. On June 14, Miss Ellis was led by a United States Army entomologist, W. C. McDuffie, to a nest on a tussock surrounded by water near Farnworth or Landing Lake. The female godwit flew off, leaving two eggs in the depression in the swale grass. By June 16 two more eggs had been laid. One egg disappeared mysteriously but on July 7, twenty-one days after the clutch was complete, the three eggs were chipped and on the 8th all three birds had safely hatched, and started foraging away from the nest.

Several other godwits were seen near Churchill and Miss Ellis states, "I cannot help but think that there must be thousands nesting in that boundless stretch of tundra"

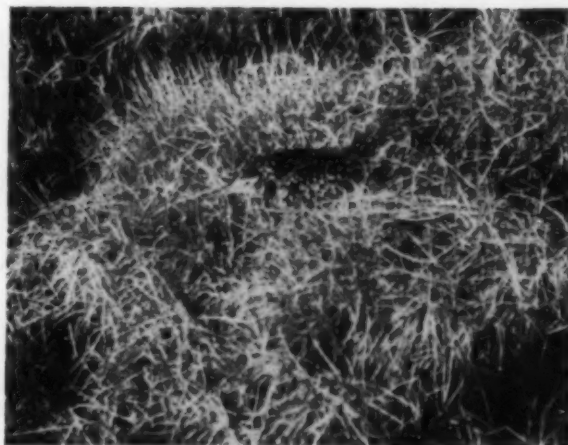
Northern phalarope, *Lobipes lobatus* (Lin-



Stilt sandpiper on nest and eggs.



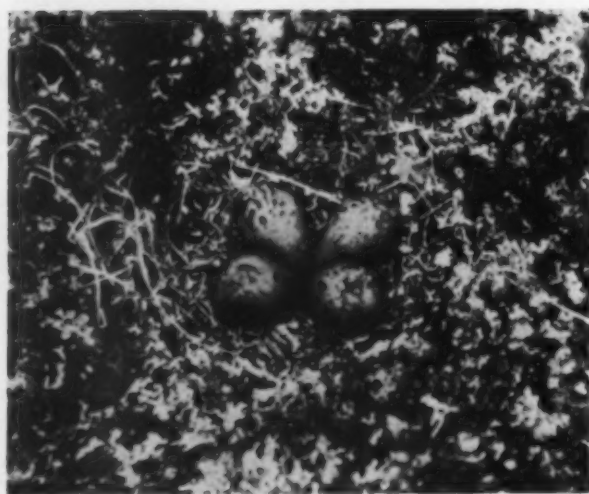
Hudsonian godwit eggs



Hudsonian godwit on nest



Semipalmated plover on nest



Hudsonian curlew nest



Arctic tern nest

naeus). A pair to four or five occur on most ponds.

Parasitic jaeger, *Stercorarius parasiticus* (Linnaeus). An acrobat of the air, this species was common off the mouth of the harbour and the shore of the bay. They chased the Arctic terns, forcing them to drop the capelin *Mallotus villosus* (Müller) which they had caught, catching the fish before they hit the water.

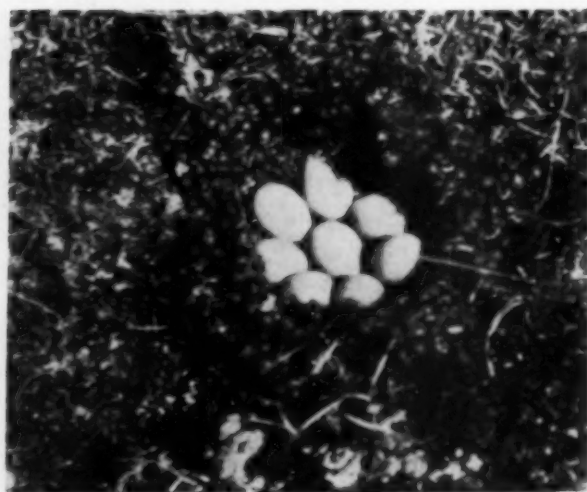
Long-tailed jaeger, *Stercorarius longicaudus* Vieillot. A few of these slimmer jaegers manoeuvred with their larger relatives.

Herring gull, *Larus argentatus smithsonianus* Coues. Birds of this species have heavy black wingtips. Common along the bay shore (p. 68).

Bonaparte's gull, *Larus philadelphia* (Ord.). This graceful little black-headed gull is common about the townsite. Two nests were found with three eggs each in black spruce trees near Landing Lake. The nests were composed of lichen about four inches thick piled on spruce branches.

Arctic tern, *Sterna paradisaea* Brünnich. Very common and nesting in a colony of about seventy on the margins and islets of Pump Lake and in small groups on nearby ponds. The nests, depressions in the moss, contain two or three eggs each. The birds, particularly the males, dive from the air and strike intruders repeatedly with their beaks.

Snowy owl, *Nyctea nyctea* (Linnaeus). Two dead birds seen, one old male being pure white. Two live birds seen June 11-13.



Pintail nest

Short-eared owl, *Asio flammeus* (Pontopidan). One seen June 14.

Horned lark, *Otocoris alpestris* (Linnaeus). Both Northern and Hoyt's subspecies were present. The commonest nesting land birds. Nests numerous in town and in danger of being trodden upon by man and dogs.

Tree swallow, *Iridoprocne bicolor* (Vieillot). One pair nesting in town.

Canada Jay, *Perisoreus canadensis* (Linnaeus). Several in edge of timber.

American Robin, *Turdus migratorius* Linnaeus. Scattered pairs, the best musician in town. A pair nested in railway coal sheds.

Gray-checked Thrush, *Hylocichla minima* (Lafresnaye). Singing in edge of woods.

Bluebird sp.? *Sialia* sp. A bluebird was seen in town but its species was not determined.

Pipit, *Anthus spinoletta* (Linnaeus). Common and nesting on rocky barrier.

Tennessee Warbler, *Vermivora peregrina* (Wilson). Reported.

Yellow Warbler, *Dendroica aestiva* (Gmelin). A pair seen at the site of the old Hudson Bay Company's post.

Black-Poll Warbler, *Dendroica striata* (Forster). Fairly common.

Rusty Blackbird, *Euphagus carolinus* (Müller). Several seen at edge of woods.

Grackle, *Quiscalus quiscula* (Linnaeus). One reported.

Cowbird, *Molothrus ater* (Boddaert). A female seen by the writer north of town on June 20. Allen recorded a female on June 10, 1945.

Hoary Redpoll, *Acanthis hornemanni* (Holboell) and Common Redpoll, *Acanthis linaria* (Linnaeus), numerous and apparently nesting.

Savannah Sparrow, *Passerculus sandwichensis* (Gmelin). Very common and nesting.

Tree sparrow, *Spizella arborea* (Wilson). Very common. One nest found with six eggs in tussock, July 3rd.

Harris sparrow, *Zenotrichia querula* (Nuttall). Common in song and nesting. Three nests found June 20-22; two in scrub spruce about five feet from ground, one with three, one with four eggs. Taverner reported these



Short-eared owl W. V. Crie

birds as nesting on mossy hummocks among spruce trees.

White-crowned sparrow, *Zonotrichia leucophrys* (Foster). Nesting freely.

Fox sparrow, *Passerella iliaca* (Merrem). Common in song in edge of woods.

Lapland Longspur, *Calcarius lapponicus* (Linnaeus). Very common nesting.

Smith's Longspur, *Calcarius pictus* (Swainson). Common.

Snow Bunting, *Plectrophenax nivalis* (Linnaeus). Common, in migration, June 11-14. A male seen at Fort Prince of Wales, July 1st.

Amphibia, Fish and Insects

Curious frog notes were common in the tundra, and a specimen seen in captivity appears to have been a Northern Wood Frog, *Rana cantabrigensis* Cope as reported by Preble, who says these northern frogs have extremely short legs "evidently correlated with the shorter period of activity".

Taverner reported no fishes in the freshwater pools and streams but the writer got two specimens of sticklebacks *Pygosteus pungitius* (Müller).

Larvae of Caddis flies, mosquitoes and black flies were common in ponds and streams and were readily killed by D.D.T. as sprayed over the tundra by army entomologists. The fly plague was reaching a climax by July 10th.

Forests and Plants

The northern forests consist of but two species, black spruce, *Picea mariana* (Mill.) B.S.P., and eastern larch *Larix laricina* (Du Roi) K. Koch.

The writer cut sections of black spruce and tamarack trees at the northern edge of the forest zone on the river flats about three miles south of Churchill. A section of black spruce (*Picea glauca*) taken 56 inches above the ground measures $10\frac{1}{2}$ by $9\frac{1}{2}$ inches and has growth rings dating back to 1650. This tree, 22 feet high and 44 inches in circumference at the base, was doubtless a seedling when Hudson discovered the Bay. A section of larch (*Larix laricina*), 22 inches from the ground, measures $5\frac{3}{4}$ by $6\frac{1}{4}$ inches

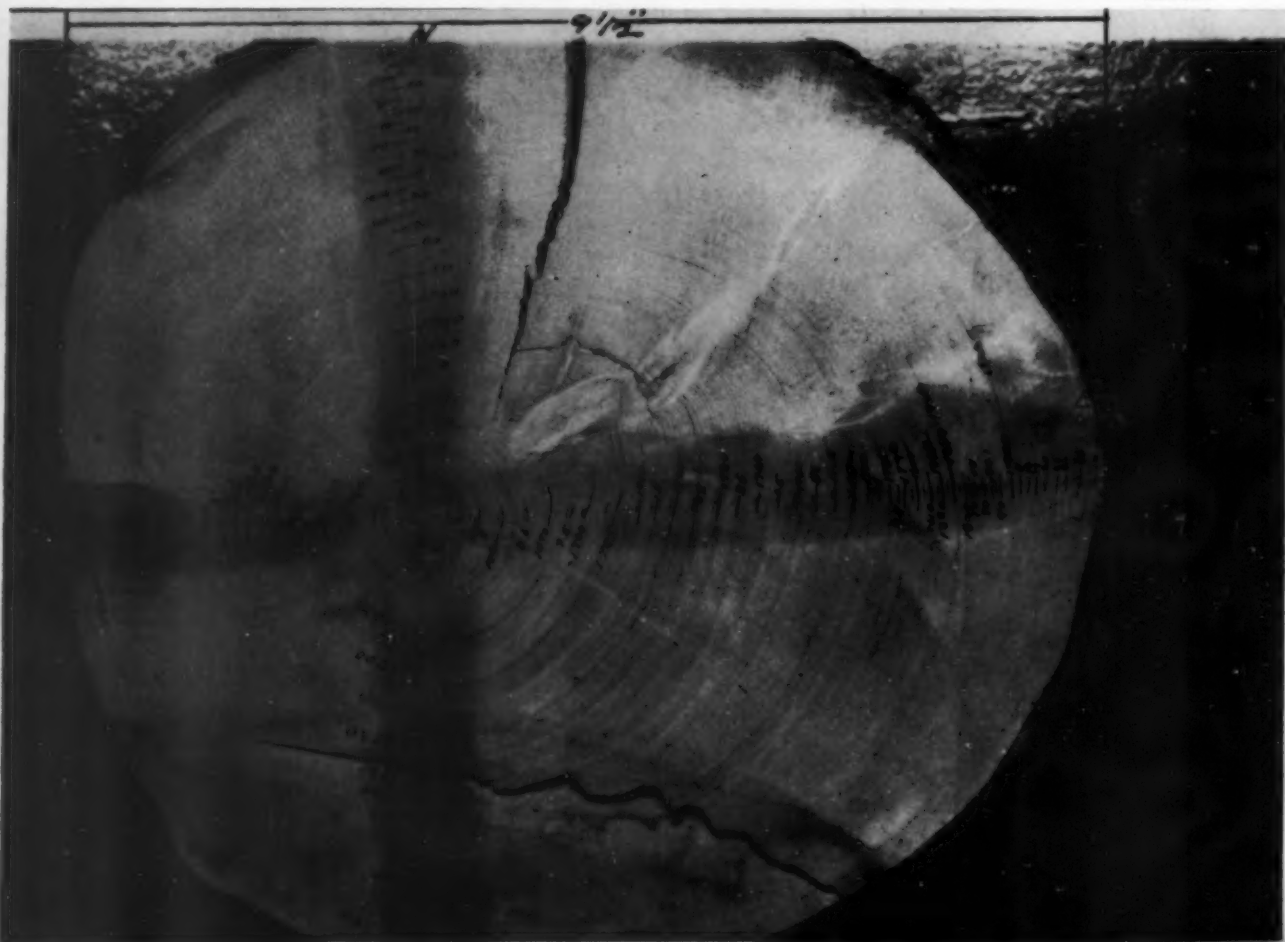
and has growth rings dating back to 1800. The height of this tree was 11 feet 4 inches. Another section was cut from a black spruce nearly 7 feet high. It measures $2\frac{3}{4}$ by $2\frac{1}{2}$ inches and dates back to 1900.

A study of these sections indicates that there are marked growth cycles, which are clearly recorded during the youth and early maturity of the trees. As the trees grow old, the rings are so closely spaced that cycles are not evident. An attempt has been made to correlate growth cycles in the younger trees with meteorological records which are available with breaks from 1885.

As only three trees* were examined, and there are long breaks in the meteorological records, only tentative conclusions may be drawn. The rate of growth appears to correspond to the mean average temperature of the growing season, June to September inclusive. The dark, late summer wood depends upon the mean temperature of

A section of black spruce (*Picea mariana* (Mill.) B.S.P.) studied in 1947.

M.Y.W.





M.Y.W.

A stretch of country on the west shore of the Churchill River. In the foreground is the cemetery of the old Hudson's Bay Company post.

August and September. There seems to be no definite correlation between growth and the date of the opening of Churchill Harbour, nor of the length of the open season. The rate of growth of a young tree has been about the same during the twentieth century as it was during the second half of the seventeenth century. There are wide annual fluctuations in growth as well as cycles of five and ten year periodicity. These are well dated for individual trees, but a series of trees overlapping in age would be necessary for definite conclusions.

Common juniper, *Juniperus communis*, occurs locally on the rock barriers back of the location of the old Hudson Bay post. Dwarf birch, *Betula glandulosa* Michx., grows as a bush over the higher ground of the tundra. Dwarf willows attain heights of only a few inches.

There is in the region a plant life† which is beautiful and interesting. The mosses and lichens occur in great variety and colour on muskeg and rock. The flowering plants begin to grow about the middle of June and flower in their turn. The specimens

collected by the author were identified by Dr. T. M. C. Taylor of the Botany Department of the University of British Columbia as follows:—*Carex* sp., *Eriophorum callitrix* Cham., *Elymus* (?) *arenarius* L., *Habenaria obtusata* (Parsh) Richards., *Orchis rotundifolia* Banks, *Salix argyrocarpa* Anders., *Salix herbacea* L., *Salix* sp., *Betula glandulosa* Michx., *Arenaria poploides* L., *Ranunculus* sp., *Anemone parviflora* Michx., *Draba* sp., *Saxifraga aizoides* L., *Ribes* (?) *cynosbati* L., *Potentilla* sp., *Rubus arcticus* L., *Hedysarum boreale* Nutt., *Astragalus alpinus* L., *Ledum palustre* L., *Andromeda polifolia* L., *Vaccinium caespitosum* Michx., *Rhodendron lapponicum* (L.); *Pyrola* sp., *Wahlenb.*, *Pinguicula vulgaris* L., *Mertensia maritima* (Ait.) Don., *Castilleja* sp., *Euphrasia* sp., *Petasites* sp., *Taraxacum* sp.

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*The trees sectioned for examination grew within one hundred yards of each other and had free access to sun and wind. Their roots rested on perma-frost and surface seepage provided a constant supply of moisture during the growing season. The one variable was obviously temperature. The prevailing winds were westerly as shown by the sweep of the branches and the tops of the trees toward the east. The growth rings are also consistently wider on the eastern side. In examining the rings the writer dated them from the bark to the centre along north, south, east and west radii, following well marked dark rings around the complete circle as a check. But few rings are incomplete and no double rings were recognized. No evidence of forest fires or of other injuries was noted. The widths of the rings were recorded on paper to double size by means of a pantograph, and the growth for each year was averaged by adding the widths on the four radii. The total growth was magnified forty times as plotted for each year, or for five-year periods, where individual records were very small.

†Plant Life of the Churchill District, E. Beckett, Canadian Geographical Journal, August 1945.



At top:—A typical Zulu kraal in northern Zululand. Note the horse-shoe formation, with the cattle kraal in the centre.



Left:—First stages in building a beehive hut—tying the framework.

Right:—High veld country, photographed from the Nongoma Court House. On the left are the buildings of the Benedictine hospital.

Zululand

by KEN. G. COLEMAN

South African official photographs

Forming the northeastern part of the province of Natal in the Union of South Africa, Zululand lies between the lower Tugela River (about fifty miles north of Durban) and the frontier of Mozambique. Its present area is about 10,425 square miles. The population in 1946 comprised some 387,000 natives and 6,000 white inhabitants.

Its climate is that of a healthy subtropical country, but precautions must be taken against malaria, especially in the coastal belt. Most of this belt is given up to European sugar farms, which stretch from the Tugela River (the northern boundary of Natal proper) as far north as Mtubatuba and Hluhluwe. Near the sea are three lakes, St. Lucia, Sibayi, and Kosi. St. Lucia has been developed as a holiday resort with excellent fishing. In the northeast are four game reserves—Hluhluwe, Umfolozi, Mkuzi and Ndumu—of which the first has special rest huts for visitors.

The magisterial district of Ingwavuma is known as Tongaland and is not really part of Zululand. Its people are Tongas and hence belong to the second wave of Bantu immigration.



The Court House at Nongoma, northern Zululand

The Zulus themselves are to be found mostly away from the coast in the healthier high veld districts of Nongoma, Mahlabatini, Entonjaneni, Nkandla, Babanango and Nqutu. Here the rolling grass lands are dotted with native kraals, though the traditional beehive hut of the Zulus is giving way in many places to the circular wattle and daub hut familiar in the Transkei. Here they keep their herds of cattle and grow small patches of maize (their staple food) and kaffir corn (sorghum), from which they make their native beer.

Eshowe is the nominal capital of Zululand, the other chief towns being Empangeni, the chief sugar centre, Mtunzini Amatikulu, Mtubatuba, Melmoth and Nongoma. A railway runs up the coast from Durban, turning inland near Mtubatuba to end near the Swaziland border at Gollel.





The site of Dingaan's kraal, from the chief's seat of judgment.

History of the Zulus

The natives of South Africa are generally known as Bantu, from a Zulu word meaning "people". Their origins are obscure, but it is believed that two or three thousand years ago a considerable number of Negro tribes mixed with Egyptian and Arab stocks somewhere around the great lakes of Central Africa. Centuries later these people moved south, west and east, driven to seek new homes by wars, Arab raids and population pressure.

As the Bantu moved slowly south along the east coast, they displaced small and scattered tribes of Hottentots and Bushmen—men of an entirely different race, now virtually extinct—towards what is now Cape Town. It was not until the eighteenth century that the Bantu first came into contact with the white man, whose settlement at the Cape began under Jan van Riebeeck in 1652.

The Bantu may be grouped in four main waves: (1) Nguni, including the Xosa, Zulu and Swazi tribes, who settled mainly in the coastal belt in what are today known as the Ciskei, Transkei, Natal, Zululand and Swaziland. (2) Tsonga or Shangaan, migrants from Mozambique composed of loosely-knit units to be found today mainly in Mozambique, Northern Zululand and Eastern Transvaal. (3) Sotho, found today mainly in Basutoland, Bechuanaland and most of the Transvaal. (4) Venda, an exceptionally

homogeneous group to be found in the Northern Transvaal.

One of the most important and best known of the Bantu peoples are the Zulus, who developed under their great leader, Chaka (Tshaka), such a flair for military organization that at one time they dominated the whole coastal belt from the Lebombo Mountains to the Umzimkulu River.

About three hundred years ago Malandele, father of the Zulu race, arrived from the north to settle with his family near the present Zululand capital of Eshowe. It was his grandson, Zulu, who gave the people its name.

Some hundred and fifty years later, the young and ambitious Chaka fled from his father Senzangakona, the lineal descendant of Zulu, and took refuge with Dingiswayo, chief of the larger Mthethwa tribe. Here he proved so apt a pupil in military matters that he soon became Dingiswayo's chief general. Dingiswayo was captured and killed by another tribe ruled by Zwide, but Chaka defeated his own father, Senzangakona, became head of the Mthethwa and eventually overwhelmed Zwide to become undisputed king of Zululand.

Military Despotism

Under Chaka, the military organization of the Zulu tribe became one of the finest the world has ever known. He formed his young men into regiments, each with a

special name and distinguishing marks, and stationed them at strategically sited depots in the territory under his sway. In this way an *impi* (army) could be concentrated at any required point at the shortest notice and quickly reinforced as general mobilization took effect.

Chaka banned the old practice of throwing *assegai*s (spears) at the enemy, arming his troops only with a broader-bladed stabbing *assegai*, without which no warrior dare return from action. His warriors were not allowed to marry until they had proved their worth in battle.

But Chaka was not only the Napoleon of southern Africa, he was also its Attila. It is estimated that he was responsible, during his reign for the killing of fully one million people and for the migration of many thousands of others to areas as far afield as Southern Rhodesia. The first British settlers to land at Durban Bay in 1823 found only a few hundred miserable natives, living on roots and sometimes on their fellows, among the kloofs and glens of the district.

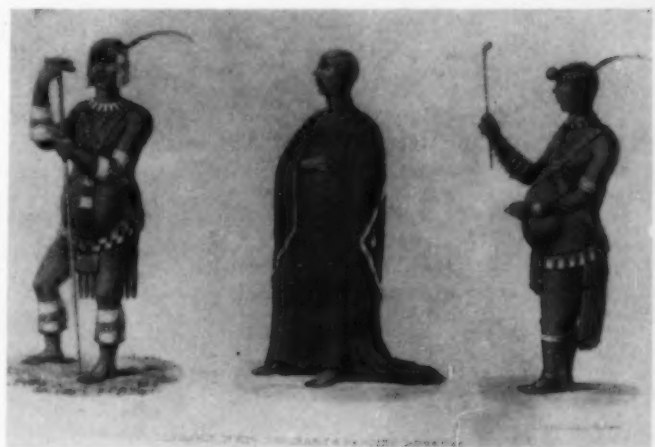
After an almost unparalleled life of war and slaughter, Chaka fell in 1828 to the assegai of his brother, Dingaan, who succeeded him. Dingaan proved almost as ruthless as his predecessor. Among his victims were the Voortrekker leader Piet Retief and about sixty of his followers, who were treacherously killed in an attempt to stem the swelling flood of white civilization in southern Africa.

This action reaped its reward on December 16, 1838, when the Boer general Andries Pretorius heavily defeated the hosts of Dingaan and forced him and his followers back into Zululand. So many Zulus perished that the river beside which Pretorius built his laager flowed with blood, and today this battle of Blood River is commemorated in South Africa by a public holiday, known as Dingaan's Day, symbolizing the triumph of civilization over barbarism.

Like Chaka, Dingaan had never allowed his male children to survive, for fear they might supplant him; so when eventually he also was murdered in 1840, the Zulus came under the rule of his more pacific brother,



An artist's impression of the interior of Dingaan's hut.



Drawings of Dingaan in his ordinary and dancing dresses.

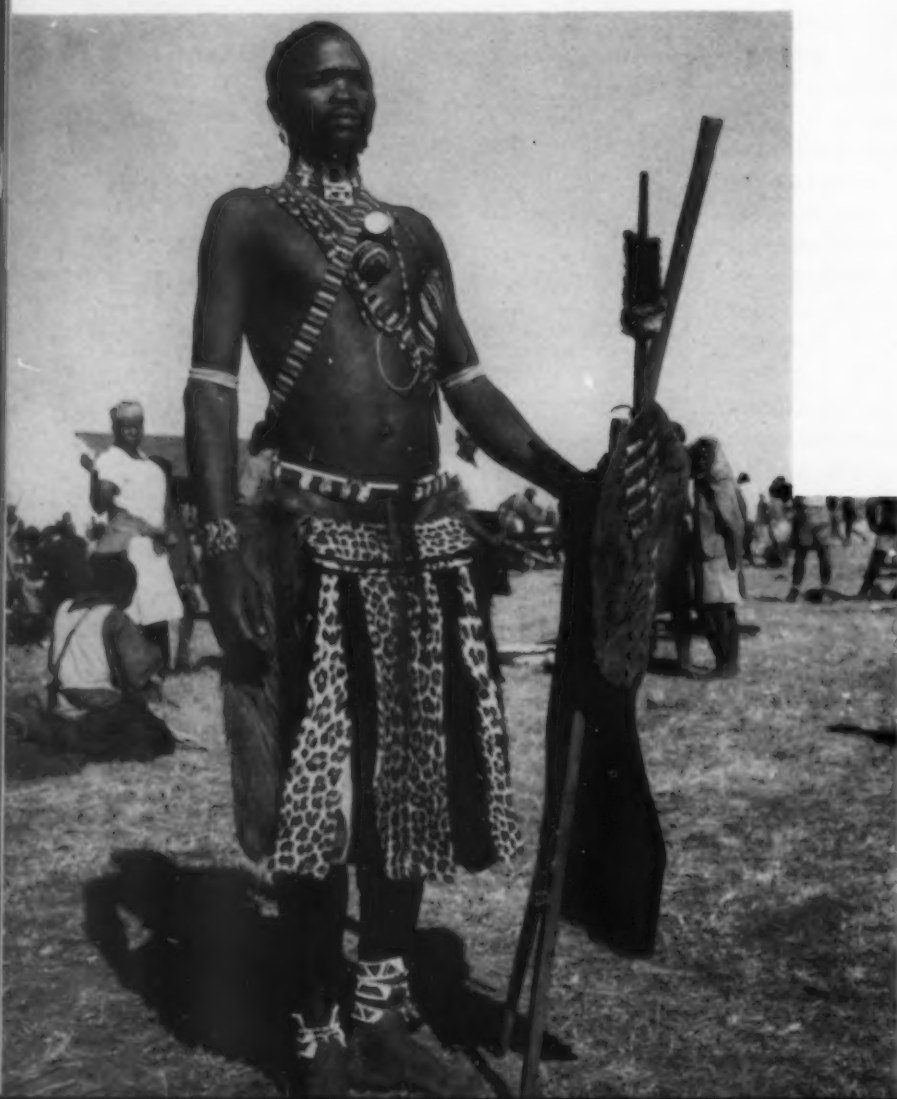


A view of Dingaan's Zululand capital at Gingindhlovu.

These early drawings were made from details supplied by a traveller, Captain Allen F. Gardiner, R.N., who was one of the few Europeans to visit Dingaan in his capital.



Zulus harvesting kaffir corn (sorghum) in northern Zululand.



A young Zulu attends a cattle sale at Nongoma in the traditional costume of his ancestors.

Two headmen photographed in full tribal dress at the Melmoth native agricultural show. The headpiece on the left is made from the tail feathers of the Secretary Bird.



*The dance of the
bride's party at a
Zulu wedding.*



*A little girl has her headdress
adjusted. The women's hair
is stiffened with clay and
intricately dressed.*



*in full tribal dress while attending the
show. The headdress of the man on the
right is of the Sakabulu bird.*





Cyprian Bhhekuzulu, legal heir to King Cetewayo.

Mpande (Panda), who reigned until his death in 1872.

Mpande was succeeded by his more warlike, son, Cetewayo, who was soon in trouble with his white neighbours in Natal and the Transvaal. War with Britain broke out in January, 1879, and only a few days later a British column under Colonel Durnford was almost annihilated at Isandhlana. The successful defence by the British of a neighbouring post at Rorke's Drift was an important factor in saving Natal from a Zulu invasion.

The British Commander, Lord Chelmsford was on the point of being superseded when he forced a further battle with the Zulus in July on the plain of Ulundi, in the valley of the Umfolozi River. For the last time in history the British army formed a square and, after they had mowed down the Zulu attacks all day with bullet and bayonet a final cavalry charge brought them complete victory at a cost of about ten men killed.

Sent first to Cape Town and later to England, Cetewayo was finally reinstated but died in 1884. He was succeeded by his son Dinizulu, who was soon at loggerheads with Zibhebhu, chief of the powerful Mandlakazi, section of the Zulu nation. To defeat Zibhebhu, Dinizulu sought the help of a number of Boers from the Transvaal and, on achieving his object, these white allies were rewarded with big grants of land, com-

prising what are today the entire magisterial districts of Vryheid and Ngotshe.

In 1887 Zululand was annexed by Britain and ten years later was placed under the administration of the colony of Natal. Dinizulu, who became implicated in several rebellions, eventually died in exile in the Transvaal. His son Solomon was never recognised as king or paramount chief of the Zulus, but on attaining manhood in 1920 was proclaimed chief of the Usutu tribe, the inner circle of the people. Solomon died in 1933 and a similar position is now held by his son Cyprian.

Zulus of Today

The Zulus of today are perhaps the most conservative of all Bantu peoples. The men of the reserves, although deprived of their favourite occupation of fighting, still cling stubbornly to their customs and ancient mode of life.

Cattle are prized for their numbers rather than their quality as a form of wealth, which is hardly surprising in a land where a prospective bridegroom must still pay *lobola* of so many head of cattle as compensation to his future father-in-law for the loss of his daughter. It follows that European administrators and field staff in Zululand have a particularly difficult task in persuading this conservative people to cull their herds to reasonable proportions to prevent soil erosion and to concentrate on quality rather than quantity.

A Zulu married woman outside the door of her hut.



As with other Bantu, the men take responsibility for looking after and milking the cattle—although this work is mainly delegated to young boys; everything else in the *kraal* or home is left to the women, who are expected to till the fields as well as carry out the cooking and household duties. Zulu men consequently take little interest in agriculture. Their chief recreations are beer-drinking and dancing, with an occasional faction fight. A few are wood carvers or clay modellers, but the chief surviving craft is beadwork, which again is restricted to women.

Most Zulus are still immensely proud, a legacy of their conquering phase under Chaka. Hence when leaving the reserves for the towns they prefer work as policemen or “bossboys”, though they also make excellent household servants. Many of those going to work prefer Durban, the nearest big town to Zululand; but there is a large Zulu community in Johannesburg.

Zulu is one of the four main Bantu languages of the Union (the others are Xosa, Sotho and Chwana) and is spoken throughout the province of Natal. Natives throughout the province also respect Cyprian, the lineal descendant of the old Zulu rulers, whom they regard as their king.

The tribal chiefs of Zululand have lost much of their authority, but remain powerful. Natural orators and inheriting the



Hezekieli Ntuli modelling the head of a Zulu woman in his kraal near Eshowe. His son, Simo, is also interested in clay modelling.

prodigious memory necessary to illiterates, they can often outwit an intelligent European in argument.

The Zulu of today is rarely seen clad only in his national dress of skins and beads: usually he wears a shirt and often trousers as well. The women are more conservative, and Zulu married women in native dress and with the traditional headdress of their own hair sewn together and stiffened with red clay, are no uncommon sight in the streets of Durban.

A woodcarver outside his hut. Ambrose Qwabe at work on a carved walking stick. His two brothers are also talented woodcarvers.





A snow-blower at work in front of St. Joseph's Oratory, Montreal.

The Saga of the Snow-Blower

by ERIC CECIL MORRIS

YOU HAVE TO GO far beyond where Montreal's mighty Harbour bridge casts its shadow over the eastern section of the city to find Bennett Street. Here, in the district of Maisonneuve, old-fashioned dwellings and historic church buildings give place to a modern brick factory, banked with windows to catch the sun that streams across the vacant lot opposite.

Behind the modern facade there is a very enterprising group of men and women, busily engaged in the unusual but typically Canadian business of producing snow-blowing machines. This plant is the fruit of long, patient years of research and experiment

conducted by Arthur Sicard, whose name the business still bears.

Born in 1876 on a farm at St. Léonard de Port Maurice, just outside of Montreal, Arthur Sicard was orphaned at an early age. It was not long before he learnt the hard fact that he would have to work for his keep, and he was allotted the task of milking the cows on the farm. When he entered his 'teens, Arthur was given the additional responsibility of delivering the milk to the bustling, growing city of Montreal, four or five miles distant.

His job was easy enough in the summertime, as he jogged along the roads with his

THE SAGA OF THE SNOW-BLOWER

horse and waggon, but when the winter came the short journey to the city became a real hardship. One day young Sicard would make his way to the metropolis with no trouble at all, the runners of his sleigh gliding effortlessly over the hard packed snow. But suddenly the wind would come up, and what he feared most, drifts, high and impassable, would block his path.

There were days, weeks sometimes, when he would be marooned at the farm, or in the city, and the milk would become spoiled and unsaleable. Such was the plight of all the farmers who lived nearby, as well as those in many other rural communities.

Without avail Sicard did his share to battle the drifts. With shovels, and teams of men and horses he helped to clear the road. But no sooner had the snow been laboriously piled at each side of the highway and the gang of farmers had moved on to yet another barrier, than the wind would come sweeping over the flat country and the walls of snow would be replaced.

At eighteen, Sicard decided to exercise a certain aptitude he believed he possessed for tinkering with machinery in the war against the snow. He tried all the old systems — the V shaped plow attached to an old motor-car, and scrapers — but to little effect. The long winter passed, the roads cleared again, and the farmers, who had watched the young

man's machines with interest, now laughed at his efforts.

During the following summer Sicard kept on experimenting. His workshop was a barn and here he continued to build ploughs, contriving what improvements he could on equipment available.

During the harvesting season he was called on to help with the haying. This was heavy, back-breaking work, but at a neighbour's farm a new machine had arrived. It was a thresher. Arthur Sicard, with his interest in things mechanical, went to see this equipment, and as he watched it seemingly eat the wheat, automatically thresh it, he received an inspiration.

If a machine would gather wheat with those mighty, rotating worms, and shoot it up a duct and into carts, why should not a similar machine be able to lift and remove snow?

In great excitement he left the fields and returned to his improvised workshop, where he rigged up a worm which would cut into the snow. Behind the worm he placed a fan. This fan would suck the snow back from the rotating worms and blow it up an ejection chute, just as he had seen the thresher bore into the wheat and spew it into carts.

As the autumn gave place to winter, for the first time young Sicard prayed for early drifting. His enthusiasm for his new machine

A rural road cleared by conventional snow plough.





A stretch of the same road as that shown on the previous page, cleared by blower.

had infected his friends. It was, therefore, with quite a considerable audience that Sicard wheeled his lumbering makeshift blower on to the highway that runs through St. Leonard, and assailed the first drifts of the season.

The truck made a gallant run through the smaller mounds of snow, but bogged down at the larger drifts. The people who had watched Sicard, who knew that all his slender savings had been invested in the old truck and the motor which worked the fan, laughed at his foolishness and left him to dig himself out as best he could.

But Arthur Sicard was not discouraged. The worms had bitten into the smaller drifts. His heart had leapt when he saw the snow shooting through the duct at the side of his ancient vehicle. He knew that all his present machine lacked was a stronger motor.

Sicard's savings had all been used. In vain he solicited assistance from his friends, pointing out that he was determined to make the roads passable in winter, to make it possible for farmers everywhere to deliver their milk to the city markets.

He met with no success. His friends and neighbours had come to regard clogged roads and ruined milk as part of their share of life's hardships. But Sicard was stubborn and he had faith in his invention.

Following a long-term plan he now set himself, he left the farm and went to Montreal,

where he went into the construction business. For years he pulled himself slowly up the ladder; the building trade was remunerative and soon he became a contractor in his own right. He laboured diligently, building many houses in the east end of the city, and always before his mind he kept his goal: to make enough money to perfect his snow-blower. Eventually he became a roads contractor. Finally, having saved what he considered to be a sufficient sum of money, he left the construction business.

On Bennett Avenue he built himself a house with an uncommonly high cellar which he used as his first city workshop. Then, with forty thousand dollars to his credit in the bank, the former farm hand started to work. He hired a few assistants, began purchasing the machinery and sheet-metal he needed.

Approximately twelve months later the people of Bennett Street were startled to see a strange-looking truck lumber down their street. It had the conventional cab in front, with an auxiliary motor where the body of normal trucks are located. In place of a bumper, however, were two rotating screws at street level, and immediately behind them a long ejection chute.

It was winter-time again, and Arthur Sicard was taking his machine to the centre of the city to put on a demonstration for the civic authorities of Montreal. This was not the first such trip Sicard made, for, although the blower removed the drifts, just as he had

THE SAGA OF THE SNOW-BLOWER

anticipated and planned it would, the authorities could not see their way clear to spending so much money for a single piece of equipment.

It was a discouraging winter, that winter of 1925-26. Time and time again Sicard showed off his machine, but to no avail. Finally, members of the city council of Outremont, a suburb which adjoins Montreal, took an interest in the blower and in the fall of 1927 the first Sicard snow-blower was sold for the nominal price of thirteen thousand dollars. Today, Outremont officials still point to No. 119 of their municipal vehicles fleet: the first Sicard snow-blower, still operating on the city's streets.

From here on it seemed that Sicard's faith in his invention was justified, for, in 1929 the Quebec Highway Department ordered a blower for the Montreal-Quebec

highway. The equipment was delivered, and was most successful. Farmers living on the parts of the highway where the blower operated were able to travel with greater ease in winter; no longer were they isolated; no longer was their produce spoiled because it could not be brought to market.

In 1932 the City of Montreal bought their first blower; and so successful was it on the congested streets of the metropolis, that today Montreal owns a fleet of twenty-nine.

For some years the Sicard organization supplied only the city of Montreal and its environs. However, in 1934, the Department of Transport at Ottawa, faced with the serious problem that wheeled aircraft could not land at Montreal's St. Hubert aerodrome in winter, investigated the possibility of clearing it with snow-blowing equipment. They came to Sicard, and as a result of this

An airport being cleared by the "free" blowing system. In cities the snow is dumped into trucks for removal.





Front of the blower, showing the two worms which cut into the snow, with the fan behind them.

visit and a subsequent purchase, a blower was used to keep the airport open to wheeled craft twelve months a year.

The year 1939 brought a challenge to many small Canadian businesses, but nowhere in the Dominion was drastic reorganization for greater production more necessary than at the Sicard plant in Maisonneuve.

The British Commonwealth Air Training Plan was coming into effect, and with it the necessity of constructing snow-free airfields from Edmonton to Newfoundland, from Labrador to Iceland. It was an emergency and Sicard, as the only manufacturer in Canada of snow-blowers, was called on to increase production immediately. Personnel in his enlarged plant jumped from 35 to 160; His maximum output of 11 blowers a year was increased to 56. Six blowers were sent to vital Gander airport in Newfoundland, and not only did they keep the field clear of snow,

The first Sicard snow-blower to be sold, in 1927, is still operating in Outremont, Quebec.



THE SAGA OF THE SNOW-BLOWER

Snow-blowers are now exported. The one shown in the picture, built in Montreal, is clearing an airport in Switzerland.



Courtesy Foreign Trade

but made connecting roadways from towns to port passable.

It was not only for airports, however, that snow-blowing equipment had become a necessity. More and more materials of war had to be moved by road, to relieve hard pressed railways. Roads normally forgotten during the winter months were now opened by snow-blowers.

When the war was over, orders began pouring in from far beyond the boundaries of the Province of Quebec, and such cities as Toronto, Hamilton, Ottawa, Saint John, and Halifax requested machines. The demand spread overseas.

At Moncton a snow-blower was mounted on flanged wheels so that it could operate on railway tracks to clear the yards. Another blower, for much the same purpose, is in use at Arvida, Quebec, and blowers are used to clear snow-slides in the Rocky Mountains.

On a given day one cubic foot of snow might weigh 19 pounds. Snow-blowers, by packing and condensing the snow, cause a cubic foot of the same snow to weigh 34 pounds. With this consequent lessening of volume and increase in weight, the snow-

blower could, in one hour, load fifty trucks, or displace 236 tons of snow.

On September 13, 1946, Arthur Sicard sat in his office and looked over the ledger figures and his records. He had sold over 250 of his blowers, he had achieved a tremendous success and had contributed something very material to the war effort. As was his custom, he then took off his coat and went to the shop that backs on to his office. Here he enjoyed doing the manual work with the men he knew so well, some indeed being members of the original gang who had helped him in his cellar workshop. As he set to work, he dropped to the floor. When his employees rushed to him they found that he was dead. Later, a heart attack was determined as the cause of death.

The Sicard company is more than just a name, more than just another of the smaller factories that cluster around Montreal's east-end. Sicard's is a monument to the memory of a man who started life on a farm and by steadfastness, determination and sheer faith had opened to many thousands of his countrymen roadways that are clear and safe in winter.



An elderly woman of the Salish tribe on Vancouver Island leans against the wood-pile as she knits one of the Cowichan sweaters (sometimes called Siwash sweaters). The total value of this home industry amounts to some ten thousand dollars a year.



The Cowichan Sweater

by LYN HARRINGTON

Photographs by RICHARD HARRINGTON

IT HAS LONG BEEN the custom to present distinguished guests with the "keys of the city", but Duncan, Vancouver Island, has a ceremonial rite of its own. For the visitor it desires to honour, a presentation Cowichan sweater serves as a lasting souvenir. Nor could any gift be more suitable than this product of an exclusively local handicraft.

The sweaters are made by the *kloochmen* (women) of a band of the Salish tribe centring around the town of Duncan. Through intermarriage, the craft has been carried to nearby parts of the island and to the adja-

cent mainland. Knitting is not an indigenous native handicraft, but was taught to the Indian women by their pioneer white neighbours. The *kloochmen* readily adopted this effective means of providing warm clothing for their men out fishing or in longshore work.

Black sheep are scorned elsewhere in the wool industry, but are prized on Vancouver Island, for the undyed fleece is used to form the bold and distinctive designs on the famous pullovers.

It was an early factor of the Hudson's Bay Company who decided not to destroy

At top:—The black sheep. They range in colour from coal-black lambs to grizzled oldsters.



Fleeces are washed free of dust and weeds and thoroughly dried before carding.

fleece. Today the largest flocks of black sheep amount to about twenty sheep. Only a few of the Indians raise their own sheep and most flocks are owned by white farmers.

The black sheep begins life as a coal-black lamb, but grows rusty brown, then grizzled grey as it ages. All stages of the wool are used in the Cowichan sweaters but the crisp black on clear white fetches the highest prices from the tourists. The grey or brownish sweaters are more popular with working men, since they need not be washed so often. Washing has a tendency to destroy their wind- and rain-resisting qualities, but does not affect their durability.

Carded on cylindrical wire combs, the fleece is ready for spinning into a thick single-ply yarn on a spinning wheel made from discarded sewing-machines. The resulting wool is almost the thickness of a lead-pencil, smooth or bumpy according to the skill of the spinner.

The knitting-needles are correspondingly thick. The sweater is a seamless garment, being knitted in circular fashion, usually pullover style. A man's sweater requires up to a dozen short stout needles whittled out of maple. Needles longer than nine to ten inches would break under the five-pound-weight of a size forty sweater.

At first, the designs were taken from traditional Indian basketry and the conven-

the black sheep which appeared in his flock from time to time. He saved them, and encouraged the use of the black wool to save tedious vegetable dyeing. In the 1920's the black wool was in such demand that sheep breeders made a determined effort to raise black sheep which would breed true. But the demand fluctuates and at present flock-masters prefer to keep a balance between the size of the flock and the value of the



The carded wool is spun into thick single-ply yarn on a converted treadle sewing machine.



tionalized and geometric designs are still used. Whale, Thunderbird and Bear appeared in stylized form. While these have been retained, many of today's patterns come from the embroidery books. Yet the old tribal tradition of respecting another person's totems still holds good, and knitters rarely trespass on one another's designs, each knitter specializing in a few patterns.

Knitting has become a favourite pastime and money-making project for many island families on the rancheries, and every member of the family plays a part in the industry. Sweaters sell in the stores at rates ranging from \$8 to \$30 depending upon size, workmanship and colour. Their sale is the main income in many families, and a source of pride to the residents, Indian and white, of Duncan.

At top:—Knitting appeals to the young women of the tribe far more than the basketry done by their mothers—but they use the well made baskets.

A collection of the heavy sweaters ready for



The Geographical Record

THE INTERNATIONAL GEOGRAPHICAL UNION

THE INTERNATIONAL Geographical Union held its sixteenth International Congress in Lisbon, Portugal, April 8-15, 1949. The congress was well attended with representatives from thirty-four member countries present. The United States, Brazil, Great Britain, France, Belgium, Switzerland, Italy, Spain, and the Scandinavian countries all sent large delegations. Canada had four representatives, Professor Benoit Brouillette of the University of Montreal, Professor George H. T. Kimble of McGill University, Major Ivor Bowen of the Dept. of National Defence, Ottawa, and Dr. F. J. Alcock of the Department of Mines and Resources. The Congress was officially opened in the Chamber of National Assembly in the Parliament Building with President Carmona of Portugal presiding and following this, His Excellency the Minister of National Education gave a reception to delegates at the Hotel Avis.

The technical sessions were held at the Higher Technical Institute, a very fine, comparatively new building. The general sessions were presided over by the president of the Union, Professor Emm. de Martonne, of the Institute of Geography, University of Paris, France. There were seven sections in which papers were given: (1) Cartography, 29 papers; (2) Physical Geography, 53 papers; (3) Biogeography, 9 papers; (4) Human and Economic Geography, 60 papers; (5) Geography of Colonization, 13 papers; (6) Historical Geography and the History of Colonization, 13 papers; (7) Methods, Teaching, and Bibliography, 25 papers. The presentations and discussions were for the most part given in either French or English and at the general sessions the remarks of members if given in French were translated into English, and vice versa.

An important feature of the Congress was the fact that many countries had exhibits of maps, publications, etc. The United States

in particular had a very fine display showing how maps are prepared from air photographs. Canada had an exhibit of some 65 maps illustrating various types produced by the Department of Mines and Resources—topographic, geologic, hydrographic and others—a panel of photographs illustrating scenes typical of the main geographical regions of Canada, a selection of reports representative of the great variety of information published by the Department and copies of a paper read at the Congress entitled "Cartography in Canada since 1938". The exhibit was the subject of many complimentary remarks.

The excursions gave the congressionists the opportunity to visit nearly any part of Portugal in which they were interested. There were six in all, as follows:

- A. The Valleys of the Minho and Douro.
 - B. The Central Coastal Region and the Calcareous massif of Estremadura.
 - C. Central Portugal.
 - D. Estremadura and Ribatejo.
 - E. Lower Alentejo and Algarve.
- Supplementary: An Excursion to Madeira.

Excursions A to E each lasted approximately one week. Number D took place prior to the Congress. Numbers A, B, C and E ran concurrently immediately following the Congress and the special excursion to Madeira followed the others and lasted for some twelve days. During the Congress shorter trips to see the city of Lisbon, to Estoril and Sintra, to Arrabida, and an afternoon boat ride on the Tagus were very pleasant and interesting interludes to the technical sessions. Other events included a reception by the President of the Municipal Council of Lisbon, visits to various Museums in Lisbon, and an evening at the Theatre São Carlos in which Portuguese folksongs and orchestral music were the features. The closing exercises were held at the quarters of the Geographical Society of Lisbon.

At the final general session it was decided that the next Congress will be held in 1952

in the United States. The new President of the Union is Dr. G. B. Cressey, head of the Department of Geology and Geography of Syracuse University, and Dr. George H. T. Kimble, Professor and Chairman of the Department of Geography, McGill University, Canada, was elected Secretary. The retiring President, Professor de Martonne, was appointed Honorary Life President of the Union. The following were elected vice-presidents constituting with the other officers, the executive committee: Mlle. M. A. Lefèvre, Belgium; Professor R. Almagià, Italy; Professor Orlando Ribeiro, Portugal; Professor Hans Boesch, Switzerland; Professor L. Dudley Stamp, Great Britain; Professor Leite de Castro, Brazil; and Professor George Kuriyan, India.

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THE PAN-AMERICAN INSTITUTE OF GEOGRAPHY AND HISTORY

THE PAN-AMERICAN Institute of Geography and History was founded to further these two studies in the western hemisphere. It established a Commission on Geography which first assembled in Rio de Janeiro in the fall of 1949.

Dr. J. W. Watson, Chief of the Geographical Bureau of Canada, is the Canadian Government representative on the Institute and on the Commission on Geography. In his unavoidable absence at the conference, Mr. William C. Stark of the Canadian Embassy attended the meetings.

Altogether 43 delegates, along with some 80 other geographers, assembled at the meetings.

They discussed the status of geography in each of the countries. Canada's comparatively favourable position in geography with the promise of considerable development in both government and university circles was commented on.

Five scientific committees on physical-geography, human-geography, regional-geography, biogeography and the teaching of geography were set up, in addition to which three panels were held on colonization and

immigration, the contribution of geography to soil surveys, and the contribution of geography to regional planning.

The most important resolution adopted by the conference was that the Institute should urge upon the governments of the western hemisphere a plan for the classification and use of land with a view to obtaining a knowledge of existing resources and suggesting improved uses of land. The Institute established a committee to assist the governments concerned in putting this plan into effect.

This resolution is of peculiar interest because it coincides with one of the International Geographical Union which proposes the establishment of a world land utilization survey. Dr. Watson represented the Canadian Government at a conference of I.G.U. officials in December, 1949, at Clark University in which plans for such a survey were discussed. Should Canada participate in the plans of these international bodies, it will be able to make an important contribution which should have an effect, not only on international policies, but on the use of geography within Canada itself.

* * *

THE COMMUNITY PLANNING ASSOCIATION OF CANADA

THE NATIONAL Citizens' Conference on Planning held its annual meeting in Winnipeg, October 6-8, 1949. In the presidential opening address R. E. G. Davis outlined the development of planning concluding: "we need to be better versed in the physical development of this country and know why it is proceeding the way it is. Then we will be in a position to help remould Canadian communities to some purpose during the years that lie ahead".

The afternoon proceedings began with an address by N. L. Nicholson of the Dominion Geographical Bureau on "The Geographer and the Background of Planning" in which he detailed the interest of the geographer in town and country planning and stressed the desire of the Geographical Bureau to serve

planners. This was followed by a talk, illustrated by slides, entitled "Fourteen Years of Planning in the Prairie Region," by L. B. Thomson, Director, Prairie Farm Rehabilitation, Department of Agriculture, at the conclusion of which the National Film Board's "Two Soils for Tomorrow" was shown. During the evening of the same day, films on planning and conservation themes were shown.

The second day was devoted to housing and metropolitan problems rather than regional planning. The geographic factors involved became quite apparent early in the day when P. Oberlander of the Central Housing and Mortgage Corporation, speaking on "Canada Houses Her Veterans", stated that a careful study of housing "in all its physical and social aspects" must precede future large scale housing development in Canada and that "site selection is perhaps the most important decision since it affects the ultimate success of any housing project." Dr. A. Rose, Professor of Social Science in the University of Toronto, followed by discussing the problems of administering metropolitan Toronto.

At luncheon, the new course in Community Planning at the University of

Manitoba was outlined and the afternoon was devoted to a continuation of the discussion on housing problems in Canada in which Dr. L. Marsh of the University of British Columbia figured largely.

At the Association dinner, held in the evening, it was announced that W. H. Clark of Toronto had been elected President and J. A. Lalonde of Montreal the Vice-President for the coming year. H. S. Churchill, Planning Consultant, New York, was the guest speaker. It was his opinion that modern cities, if they are to survive, "must be redeveloped along lines that will give consideration to the biological and psychological needs" of the inhabitants and he gave his ideas on how a city should be redeveloped.

The third morning was devoted to a résumé of the Conference and a discussion of the suggestions and recommendations for the future. From a geographical standpoint, it was interesting to note that encouragement to local authorities to develop methods of surveying and analysing community needs and to set up planning authorities was advocated. It was also suggested that a teachers' manual on class projects in local study and planning be prepared for use in the Social Studies curricula.



THE VOORTREKKER MONUMENT

Near Pretoria, in the Union of South Africa, a monument has been erected to commemorate the Boer pioneers who trekked from Cape Colony across South Africa in the 1830's. Dissatisfied with British rule, large numbers of Boers packed their heavy ox-wagons and migrated north and east into the unknown country. These "Voortrekkers" wanted to establish their own pastoral state, free from the control of a remote overseas government. (Earlier generations had, in the same spirit, moved north from the Cape of Good Hope to avoid restriction by the Dutch government.) Some settled in what became the Orange Free State, some pushed farther north into the Transvaal, and another group, under Piet Retief, headed through the Zulu Kingdom towards the Natal coast. Retief was treacherously killed by Dingaan and hundreds of Voortrekkers lost their lives at the hands of the Zulus. Months later they were avenged by a force under the command of Andries Pretorius and the Zulus were vanquished at the Battle of Blood River on December 16, 1838. On December 16, 1949, the Prime Minister, Dr. D. F. Malan, officially dedicated the Voortrekker Monument. The vast crowd, estimated at 200,000, that attended the ceremony, was also addressed by General J. C. Smuts. Within the massive stone monument is a sarcophagus for the remains of Retief and his men.

The photograph at left shows below the monument part of the crowd which filled the amphitheatre on December 16th and, in the foreground, some of the dispatch riders who came from all parts of the Union.

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* Newfoundland previously listed under North America, III B.

EDITOR'S NOTE-BOOK

Kåre Rodahl, a native of Norway, was granted his medical degree by the University of Oslo. Since 1937 he has been interested in various branches of arctic research, mainly in regard to biological and particularly nutritional problems, and in the investigation of night vision. He has been on scientific expeditions to Northeast Greenland, to Iceland, to the sealing fields east of Newfoundland and Labrador, and to Peary Land. During the war Dr. Rodahl served with the Norwegian Forces as a paratrooper and as an instructor in arctic warfare, completing his medical course after the war. Dr. Rodahl has published many scientific papers in Norway and in Britain, as well as semi-scientific articles, and his book in English, *The Ice-capped Island*, was published in Britain in 1946. He was nutritional adviser to the current Norwegian-Swedish-British Antarctic Expedition, and he is at present studying arctic biology and nutrition in North America.

* * *

W. V. Crich of Toronto is by profession a school teacher, but for many years his avocation has been the study of birds. With infinite patience he has photographed all phases of bird life in the southern Ontario area and his deep interest in natural history has led to fine camera studies of animals and flowers as well as the rural scene. Mr. Crich's photographs have appeared in many Canadian periodicals and books.

M. Y. Williams is a native of Bloomfield, Ontario. After graduating from Queen's University he studied at Yale University for his Ph.D. Dr. Williams taught for a few years, then joined the Geological Survey of Canada, on whose staff he served for some twelve years. In 1921 he joined the staff of the University of British Columbia where he is now head of the Department of Geology and Geography. As a consulting geologist Dr. Williams specialized in petroleum and natural gas and was concerned in many geological projects, including oil field development, the Pacific Great Eastern Survey, survey of Hong Kong, and the Alaska Road planning project. Dr. Williams is the author of numerous bulletins and articles on geological subjects. A general article by him on Churchill, Manitoba, was published in the September 1949 issue of the Journal.

* * *

Ken G. Coleman is attached to the Native Affairs Department of the Union of South Africa Department of Interior. He has been making a close personal study of the African way of life.

* * *

Eric C. Morris is a free-lance writer who lives in Montreal. He has published one book, *A Voice is Calling*, and has another in preparation.

* * *

Lyn and Richard Harrington travel to all parts of Canada and record the many aspects of the Canadian scene in story and picture. Mrs. Harrington does the writing and her husband the photography.

ANNUAL MEETING

The Canadian Geographical Society

The twenty-first Annual General Meeting of the Society will be held on Friday, February 24th, 1950, at 8.30 p.m. in the Lecture Hall of the National Museum of Canada, Ottawa. Following the business meeting there will be an address by General A. G. L. McNaughton who will speak on "North American Defence". The meeting will be held in the presence of Her Excellency, the Viscountess Alexander.

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AMONGST THE NEW BOOKS**A Short History of the Middle East**

by G. E. Kirk

(Public Affairs Press, Washington, D.C., \$3.75)

Here is a book of service to those who are interested in the current problems relating to the Arabian Peninsula and the Arabic-speaking lands on its northern border, northeast Africa, and Anatolia—in brief, the Middle East.

The ancient history of the area is sketched in deftly, the story being one of the appropriating of the Middle East from the shrinking eastern Roman and the Persian Empires by the followers of Mohammed the Prophet, and of the expansion of the Islamic civilization from India to Spain with its important contributions to the European renaissance. Islam declined, the Cape route to the Indies was discovered and the Middle East eventually became a shock absorber for the Indian Empire of Britain. Then followed a modern period in which nationalism groped for expression, to burst into a struggle for independence in the years between the two world wars. This struggle was as nothing compared with that which followed the 1939 war, the emphasis being concentrated on Palestine. One must sympathize with the British Government—whatever they did was predestined to offend one side or the other; they could not please both. The people who "sought Persian favour to right the wrongs done to them by Nebuchadnezzar", who had sought the favour of freedom from every subsequent conqueror, welcomed the entry into office of the British Labour Party which had "declared its support for unlimited Jewish immigration" into Palestine in a strange manner. There were "incidents" and a "revealing document demonstrated collusion on a high level between the Agency Executive and the terrorist organizations whose activities they always officially deplored and declared themselves powerless to prevent".

What, then, of the morrow? The author suggests that religion may make man live in harmony with his neighbours in the Middle East. A careful study of this well-documented work suggests that harmony will come only when leaders, as well as those whom they lead, learn the value of self-discipline and integrity. This work is recommended to general reader and student alike.

H. C.

* * *

Mount Everest 1938

by H. W. Tilman

(Cambridge University Press—Macmillans, Toronto, \$3.75)

THIS BOOK, written by the leader of the expedition, describes the most recent attempt to climb Mount Everest. It was the sixth expedition to have visited the mountain since the first reconnaissance in 1921. It is a remarkable feature of the challenge offered to man by the world's highest peak that it attracts not only mountaineers, for that is to be expected, but also considerable public interest. All the expeditions have

been lucky in possessing both men who can write lucidly of their experiences and expert photographers. The 1938 party was no exception. Mr. Tilman's account, aided by excellent illustrations, carries the reader from the preliminary stages in London and India into Tibet, and onto Everest until they are turned back above the North Col at 27,400 feet.

The 1938 party broke away from the tradition of a large complex expedition. There were only seven Europeans, all of whom were experienced mountaineers, who, with one exception had been on Everest before. In the first chapter of the book Mr. Tilman makes a strong case for the small simple party, which reduces costs, simplifies transport problems and does not disrupt Tibetan economy. He would discard the scientists, doctors and less essential equipment, and only carry the minimum of food. Despite the leader's protestations to the contrary, the dialogue reproduced in the book and the appendix suggest more food and greater variety would have been welcome by some of the members.

Mount Everest would not be particularly difficult to climb if it were 15,000 feet lower but the altitude, weather and inaccessibility have defeated all attempts to climb it. The author is of the opinion that the mountain could and should be climbed without the aid of oxygen to reduce the effect of the rarified air. His views are not however accepted by all mountaineers. Ideally the apparatus should combine light weight with ease of breathing and mechanical simplicity. In 1938 two types of oxygen apparatus were taken but neither was satisfactory. Future expeditions may be able to utilize the improved apparatus developed by the air force during the war.

The influence of the weather is even greater than the lack of oxygen. In spring the prevailing winds are from the northwest and the mountain is generally swept clear of snow, but the weather is too cold for climbing. By early summer the monsoon has arrived from the southeast and with it warm weather and considerable snow. The only time when success may be achieved is in the period of calm weather when the northwesterly gales have stopped but before the monsoon commences. In 1936 and 1938 the calm spell did not develop and the mountain was unclimbable in both years.

In an appendix to the book the existence of the Abominable Snow Man is discussed. The footprints of this creature have been seen in many parts of the Himalayas. They have been described by some as the footprints of a giant man, by others as those of a bear. Since the natives believe they drop dead if they see the creature and it has only been seen once by a European in the distance, the Snow Man's identity remains unknown. The author obviously believes in him and the reader is left hoping that despite the scientists the Snow Man does exist.

Mr. Tilman has written an entertaining book, and although the expedition failed in its main objective the story is a worthy successor to the accounts of the earlier expeditions.

JOHN B. BIRD.

Webster's Geographical Dictionary

(G. & C. Merriam, Springfield, Mass., \$8.50)

This new gazetteer or geographical dictionary with its 40,000 entries, numerous maps, and hundreds of thousands of facts is a major, and a most commendable, undertaking and each man on the long and learned list of editors and consultants is to be congratulated on producing a book which gives us something to hang on to for a brief time during the convulsions that are shaking political boundaries the world over.

It is prefaced by detailed explanatory notes as to how the material is arranged and, with even greater detail, as to how the names of all these places are to be pronounced, and there must have been long and thoughtful conferences about these important matters. No doubt the best solution was arrived at in most cases, but in some ways the results are not entirely satisfactory. For example, let us look up London. I mean London, the place which they refer to in this book as the largest city in the world. London itself is discussed only after disposing of two tiny places in the United States, London in Ontario, and the County of London. For Cambridge, we have to wade through seven little places in the States and then we find it hiding in scholarly seclusion behind Cantabrigia. Oxford, not to be outdone in modesty, hides behind the alias of Oxonia.

It is impossible to resist the temptation to wander through such a volume as this, continuously distracted by fascinating side alleys. Occasionally we are gently corrected and set straight as when we learn that we have always been wrong in talking about Timbuktoo; it should, teacher says, be Tombouctou. There seems to be some misapprehension as to which part of Newfoundland is the "French Shore", and the details about Ottawa are not quite correct. For complete frustration the reader is recommended to look up "Old Deer". He will be referred to Old DEER.

Nevertheless, if geography enters at all into your business this is a book you can hardly do without.

DOUGLAS LEECHMAN

* * *

By Moonstone Creek*by Kenneth Wells*

(Dent, Toronto, \$3.75)

This is one of those books which succeed in giving one a good impression of themselves from the start. First of all, it's a nice book; that is, a good example of modern book production. The type is clear and well-set, the wood-cuts by Lucille Oille (Mrs. Wells) are skilful and attractive, the paragraphs are short and well-interlarded with dialogue. One is immediately tempted to read it.

On further acquaintance, the first good impression is strengthened. It is pleasant to encounter the essay form again, and to read an author who finds time to tell you what he feels about the sounds and sights of the countryside, especially when he speaks so obviously from his own experience, and does not depend on his reading for his facts. That this is the case is revealed

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by occasional lapses, such as 'teasil' for 'teasle', 'alderberry' for 'elderberry', and some slight misapprehensions about vegetable dyes. Nor has the author yet discovered that it is toads that lay their eggs in 'ribbands', rather than frogs.

The wood-cuts, too, are worth careful attention. The shadows of bare trees on snow are softly and convincingly rendered, and on page 123 clever use of highlights gives us a fine rotundity of pig.

Some of these brief essays, which remind one of the human interest stories we find "boxed" on the front page of newspapers, are delightful, such as the sensitive and sincere "Of the Passing of Skudger", and the equally well-done "Of a Good Dog".

Just the kind of book to give somebody who knows the Ontario country landscape well, or to somebody else who should know it.

DOUGLAS LEECHMAN

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